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The work opens with a section on the construction and use of the microscope, its accessories and reagents. The important types of technical products that are treated are the following: starches and inulin; vegetable fibers, including hairs, with a section on the examination of paper; animal fibers, mineral fibers, and textile fabrics; stems and roots, including woods (gymnospermous, dicotyledonous, and monocotyledonous), barks, and rhizomes, with some practical examples of the problems that are submitted for solution; leaves, under which only sumach leaves are treated; flowers, with insect powder alone treated; seeds and fruits, including a large range of oil cakes; and finally teeth, bone, horn, etc.

Of course in such a list there must be an end somewhere, for space is not unlimited; but one wonders at the basis of some choices. The line between drugs, foods, and technical products is not an easy one to draw; but if wheat and barley appear among the fruits, why not maize and rye? If sumach leaves, why not tea and tobacco? If insect powder, why not saffron? But it behooves us to be thankful for what there is, rather than to complain of what there is not. And what there is is sure to be thoroughly helpful.

The publishers' part has been well done. The illustrations are well printed, the text clear, and the binding substantial. The book is essential for public libraries and for governmental and university laboratories.—C. R. B.

Works of Léo Errera

We have already noticed in these pages the sumptuous republication of the work which, under the direction of LÉO ERRERA, issued from the botanical institute of the University of Brussels. In these volumes⁷ his own original work takes a conspicuous place. But he did much other writing, popular, pedagogic, philosophic, literary, which is to be preserved by original publication or reprinting in a series of six volumes now being issued under the title *Recueil d'œuvres de Léo Errera*.⁸ Of these three have appeared. Two deal with botanical subjects and one contains verse and prose on a variety of topics—addresses, thoughts, philosophic epigrams, etc. The botanical topics of the first volumes are: A letter on the vegetation about Nice; Agriculture and horticulture in Norway (largely a criticism of SCHÜBELER); Structure and modes of fecundation in flowers (200 pp.); Secondary heterostylic characters of primroses (a posthumous work completed by Miss J. WERY) (30 pp.); Progress of systematic botany; A neglected field of research (the efficacy of the defensive structures of plants); ENGELMANN's bacterial method; Compass plants. In the second volume we find: Respiration of plants (one of a course of public lectures); De grâce, des noms latins (a plea for the avoidance of vernacular names); Scientific bases of agriculture (36 pp.);

⁷ Recueil de l'Institut Botanique Léo Errera. BOT. GAZETTE 43:215, 347. 1907; 45:201. 1908.

⁸ Recueil d'œuvres de LÉO ERRERA. 8vo. Vols. I, II, Botanique Général. pp. iv+341. Vol. VI, Melanges (vers et prose). pp. xiv+222. Bruxelles: H. Lamertin. 1908.

Descriptive text of physiological charts (90 pp., including small reproductions of the charts which he published in conjunction with LAURENT); Letter prefatory to DE WILDEMAN'S *Flore des Algues de Belgique*; An elementary lesson on Darwinism (106 pp.; an admirably clear and brief presentation, which appeared first in 1900 and is now printed as he had revised it for a third edition). This volume closes with three posthumous articles: Plants in contrast with other beings; What there is in a plant; The *épopée* of a ray of sunlight.

These volumes, as well as the more strictly scientific ones, will form a worthy memorial of this distinguished *savant*, whose writing is always luminous and inspiring. His bibliography, though voluminous (287 titles, as we learn from an interesting biography just published⁹), is remarkable, not alone for its extent, but for its value. To have all his work collected is a real boon.—C. R. B.

NOTES FOR STUDENTS

Papers on mucors.—Two valuable papers, largely taxonomic in character, have recently appeared on the mucors. In two ways they show an advance over other taxonomic work in this confused group. In the first place the center for fungus cultures maintained by the *Association Internationale des Botanistes* has been made use of, and the species investigated were compared as far as possible with named cultures from this and from other sources. Provided contamination of cultures in the source of supply is avoided, this center in Amsterdam affords a ready method of checking up determinations and should be of increasing value to mycologists. In the second place the differentiation of species according to their sexual character into homothallic and heterothallic forms is recognized as an item in the classification, and in heterothallic species the production of zygospores, when a given strain is grown in contact with the opposite strain of a known species, is used to establish its specific identity with the form tested.

HAGEM¹⁰ announces his paper as a preliminary contribution to a study of soil mucors. By exposing Petri-dish cultures to the air and allowing the spores which fall on them to develop mycelial colonies, he finds with SAITO that spores of the mucors, both absolutely and relative to other molds, are unexpectedly of infrequent occurrence in the air. Only seven species were thus found. In investigating the mucor flora of the soil, samples from different kinds of soils were sown on various nutrient substrata, and the resulting growths isolated in pure cultures. Sixteen different species, confined to the genera *Mucor*, *Rhizopus*, *Absidia*, and *Zygorhynchus*, were found, of which six are described as new, viz., *Mucor strictus*, *M. sphaerosporus*, *M. griseo-cyanus*, *M. silvaticus*, *M. norvegicus*, and *Absidia glauca*. Four new forms are added to the list of heterothallic species. One of these, *Mucor hiemalis*, was especially investigated as regards the distribution in

⁹ FREDERICQ, LEON, AND MASSART, JEAN, Notice sur LÉO ERRERA, membre de l'Académie. 12mo. pp. 153. Brussels: Hayez. 1908.

¹⁰ HAGEM, OSCAR, Untersuchungen über norwegische Mucorineen, I. Vidensk.-Selsk. Skrifter. I. Math.-Nat. Kl. No. 7. pp. 50. 1908.